Trip Report: March 3, 1998 Mixed Waste Rulemaking Site Visit to Arizona Public Service (APS) in Palo Verde, Arizona

Participants:

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General Site Information:

Arizona Public Service Palo Verde Nuclear Generating Station (PVNGS) is a 3 unit pressurized water reactor (PWR) on a 4500 acre site located 55 miles from the center of Phoenix. It is the largest nuclear power plant in the United States and for the third year in a row has produced and provided more electricity in the U.S. than any electric generator of any kind (not just nuclear generators).

All three units are pressurized water reactor (PWR) systems. Each produces approximately 1270 net megawatts of electricity and serves the energy needs of approximately 4 million people in the Southwest. The PWR units are nearly identical and low-level radioactive waste is generated in all three units.

Construction began in 1976. Dates the units came on-line are: 1/86 - Unit 1; 9/86 - Unit 2; 1988 - Unit 3. PVNGS is on an 18 month refuelling cycle (changing nuclear fuel rods in one unit each 18 months), they do not schedule (refuelling) outages in the heavy use months of May through September. PVNGS has a 30 year NRC license. The operational life of the reactor vessels will be the limiting factor on how long PVNGS can operate.

Mixed radioactive and RCRA hazardous wastes (mixed wastes) are not generated on a consistent basis. The facility is currently a RCRA large quantity generator for all RCRA wastes including mixed wastes and is continually striving to minimize wastes and become a RCRA small quantity generator. PVNGS originally used approximately 6,000 chemicals on site. Using product substitution, they reduced chemical usage to 2500.

<u>Water</u>

The water source to condense steam is pre-treated sewage effluent from Phoenix and the surrounding cities. The pre-treated sewage effluent is treated at the PVNGS water reclamation center to remove selenium, magnesium and calcium to protect their equipment from scaling. They

have an 80 acre reservoir for the cooling water. So far they have had 30 % more water than needed in peak years. PVNGS is a zero discharge facility: after cooling the used water is evaporated in evaporation ponds which also serve as migratory bird reservoirs in the desert. Arizona Public Service (APS) has two main groundwater wells which provide water for other needs at PVNGS.

Mixed Waste

RCRA Permit Status

PVNGS has a RCRA interim status permit for mixed waste storage. Mixed wastes are not generated on a consistent basis. Arizona Department of Environmental Quality (ADEQ) is deferring calling in the RCRA Part B storage permit in response to the April 1997 letter from EPA, based on the facility's compliance with storage requirements and appropriate management measures. At the current time ADEQ is comfortable with the PVNGS mixed waste storage facility and management procedures.

Management Practices to Meet NRC and RCRA Requirements

Mixed radioactive and RCRA hazardous wastes (mixed wastes) are not generated at PVNGS on a consistent basis, and PVNGS makes great effort to have mixed wastes treated and disposed of off-site rather than stored on-site. The DAWPS facility is where Dry Active Waste is processed and shipped and is also the location of the mixed waste storage unit. The mixed waste storage unit is a fenced off and locked enclosure in the DAWPS facility building. The mixed waste storage unit has the capacity to store 600 drums. However, PVNGS never has more than 30 drums in storage at any given time. This is the area we physically toured. Access to the DAWPS facility building was allowed after we passed security checks through a metal detector.

Access to the Radiation Control Area (RCA) was then allowed after we each had personal dosimeters to wear while touring the RCA. To exit the radiation control area we individually went through a whole body radiation reader. Fortunately none of our clothing picked up radiation (including naturally occurring radon) and we were able to exit the radiation control area and the facility.

In the fenced and locked mixed waste storage unit, drums are stored on individual berms which are designed to hold two layers of four drums each. The berms also each have secondary containment for leak collection of the total capacity of eight 55 gallon drums. Drums currently in storage are not stacked (one layer only). The storage area is very clean, well maintained, and well constructed. The drums currently in storage are stainless steel, some with smaller drums inside.

Additional management practices for management of low-level rad waste (including mixed waste) are identified in the PVNGS Site Tour Handout, the categories include:
1) Administrative Controls; 2) Physical Controls; 3) Monitoring of Anything Leaving the

Radiation Control Area; 4) Personnel Qualifications; and 5) Radwaste Processing Activities.

Processes by Which Wastes are Generated

Mixed waste is not generated on a consistent basis. In December 1997, 20 pounds of Nickel-Cadmium batteries with a curie count of 8.5 E-8 were generated when the lighting fixtures in the three PWR units were replaced for maintenance purposes. Aside from this, there has been no mixed waste generated at PVNGS in approximately 10 years.

Current Annual Mixed Waste Generator Volume

Mixed waste is not generated on a consistent basis (see previous discussion), as PVNGS has been successful in minimizing the types and quantities of mixed waste (as well as low-level rad waste and hazardous waste) that are generated.

Waste Minimization

PVNGS has significantly reduced the volumes of waste generated through an extensive chemical control program. Their goal is to get down to a small quantity generator status. PVNGS originally worked with approximately 6,000 different chemicals. Through the use of product substitution they have reduced the number currently used to 2500. Specific to mixed waste, the major waste reduction has come from two changes in practice: 1) substitution of wet wash for uniforms rather than solvent cleaning processes; and 2) using grit and sandblasting rather than solvents for decontaminating tools. These processes create low-level radioactive waste rather than mixed waste.

Types of Waste Currently Stored

The types and volumes of mixed waste currently stored at PVNGS include Toluene (F005); Valclene Spill Cleanup (F002); Valclene Sludge (F002); Freon Sludge/Process Equipment Clean-out (F002); Valspar Thinner/Spent Solvents (F001-3, F005, D001); Hydrazine (absorbed) (U133); Paint Waste (D001, D005, D007, D035); Neo Lube (D001); Barium Chromate (D005, D007); Nickel-Cadmium Batteries (D007); and Toluene (D001). These are stored as described above in the radiation control area (RCA) within the DAWPS facility.

Volume of Legacy Waste

PVNGS has approximately 3000 pounds of legacy mixed waste, 90% of which is freon waste (from sludges and filters).

Efforts Undertaken by PVNGS to Dispose of the Wastes

PVNGS has a RCRA interim status permit for mixed waste storage. They did not pursue a treatment permit because they had expected commercial treatment and disposal to become available to handle their mixed wastes.

Treatment and disposal options for mixed wastes are available from the following companies:

* Envirocare
* DSSI
* NSSI
* Molten Metal (M4)
* ATG (Applied Technology Group in Washington State)
* CWS (Perma-Fix) (Used to be Quadrex)

PVNGS conducts extensive on-site audits of companies they are considering having manage their mixed wastes. They were pleased with Molten Metal, and were poised to send M4 some of their wastes. However, at the time of our site visit M4 was undergoing bankruptcy proceedings, because the M4 mixed waste treatment process was not receiving enough waste from customers to ensure financial viability. Wastes that could go to Envirocare have been sent there. Some wastes cannot be accepted by Envirocare because the waste form and/or radiation levels are beyond their permitted and licensed capabilities.

Costs

Costs for disposal of mixed wastes are generally much greater than those for hazardous wastes and low-level rad wastes. (Hazardous Waste: $130-$200/cubic foot; Low-Level Rad Waste: $300-$600/cubic foot; Mixed Waste $150-$10,400/cubic foot). Actual costs PVNGS incurred include over 3 million dollars to dispose of 21,000 cubic feet chromium contaminated waste at Envirocare (greater than 2 million dollars was for pretreatment), and $220k for treatment of 16 drums at DSSI.

Regulatory Relief Desired

PVNGS was definitely interested in some form of regulatory relief for their mixed waste. Although we could not be definitive in our proposed approach, PVNGS was very comfortable with a scenario that included only NRC oversight of their mixed waste.